- **Course Number and Title:** M E 332. Vibrations
- **Catalog Description:** Vibration of single and n-degree of freedom systems considering free, forced, and damped motion. Lagrange s equations. Dynamic stability. Controls. Matrix iteration.
- **Credit Hours:** 3 Credits (3)
- **Prerequisite(s) / Corequisite(s)** Prerequisite(s): M E 328, M E 261 and ENGR 234
  Corequisite(s): None
- **Required:** Required for BSME Degree (as Mechanics Elective)
- **Course Availability:** Fall Semester Only
- **Instructor (Usual):** Dr. Abdessattar Abdelkefi (See https://mae.nmsu.edu/people/faculty.html)
- **Textbook:**
  1. S. S. Rao, Mechanical Vibrations, 4th ed., Prentice Hall
  2. W. T. Thomson and M. D. Dahleh, Theory of Vibration with Applications, 5th ed., Prentice Hall
- **Course Learning Objectives:** After completing this course, a student should be able to:
  1) Analyze free and forced vibrations of a single degree-of-freedom (DOF)
  2) Analyze free and forced vibrations of multi-DOF systems
  3) Perform modal analysis for engineering structures to understand mechanical vibrations in terms of normal modes.
- **Topics Covered:**
  - Derivation of equations of motion
  - Free vibrations of SDOF systems
    - Undamped / damped responses
    - Experimental identification
  - Forced vibrations of SDOF systems
    - Harmonic excitations
    - Beating phenomenon
    - Base excitations
    - Rotating unbalance
  - Undamped free vibrations of 2-DOF systems
    - Natural frequencies / mode shapes
    - Modal coupling
    - Beat phenomenon / normal modes
  - Forced vibrations of 2-DOF systems
    - Vibration-absorber (Tuned-mass-damper system)
  - Normal mode vibrations of MDOF systems